

# Honeywell

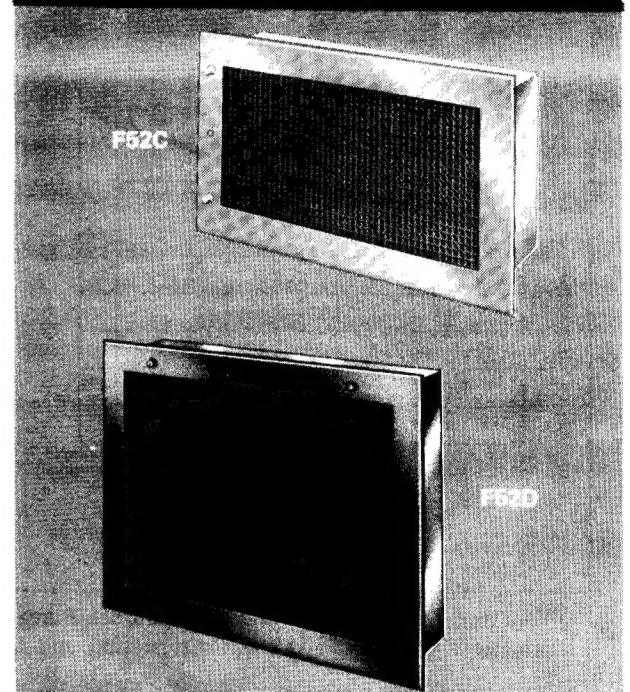
THE F52 RETURN GRILLE ELECTRONIC AIR CLEANER IS WALL OR CEILING MOUNTED IN THE RETURN AIR DUCT OF A CENTRAL FORCED AIR HEATING, COOLING, OR VENTILATION SYSTEM. IT REMOVES AIRBORNE PARTICLES, SUCH AS DUST, SOOT, POLLEN, TOBACCO, AND COOKING SMOKE FROM THE AIR CIRCULATED THROUGH IT.

- ☐ The F52C has 1 electronic cell and has a rated capacity of 1000 cfm [1700 m<sup>3</sup>/hr].
- ☐ The F52D has 2 electronic cells and has a rated capacity of 2000 cfm [3400 m<sup>3</sup>/hr].
- ☐ Lightweight electronic cells fit in a home dishwasher for periodic washings.
- ☐ Power supply is energized by an airflow switch—no interconnection to the fan system is required.
- ☐ Pressure drop is approximately equal to that of a regular fiber-glass filter.
- ☐ Self-regulating power supply requires no fusing or interlocks to protect equipment or personnel. Even a dead short across the output will not damage the power supply.
- ☐ Indicator light, visible through grille, shows that the power supply is working properly.
- ☐ Automatic interlock switch disconnects power when unit is opened.
- ☐ Test button to instantly check system operation.

S.K.  
9-76 (.146)

**Bel-Aire**  
ElectronicAirCleaners.com

## RETURN GRILLE ELECTRONIC AIR CLEANER



## F52C,D

Form Number

60-2407

# SPECIFICATIONS

## MODELS:

F52C Return Grille Electronic Air Cleaner. One cell model for up to 1000 cfm [1700 m<sup>3</sup>/hr]. Includes high voltage power supply, 1 electronic cell, prefilter, grille, and sail switch.

F52D Return Grille Electronic Air Cleaner. Same as F52C, but with 2 cells for airflow up to 2000 cfm [3400 m<sup>3</sup>/hr].

## ELECTRICAL RATINGS (input):

Voltage and Frequency—120V, 60 Hz; 220/240V, 50 Hz.

Power—25 watts (F52C), 50 watts (F52D) at 120V.

Current—0.2 amp (F52C), 0.4 amp (F52D) at 120V.

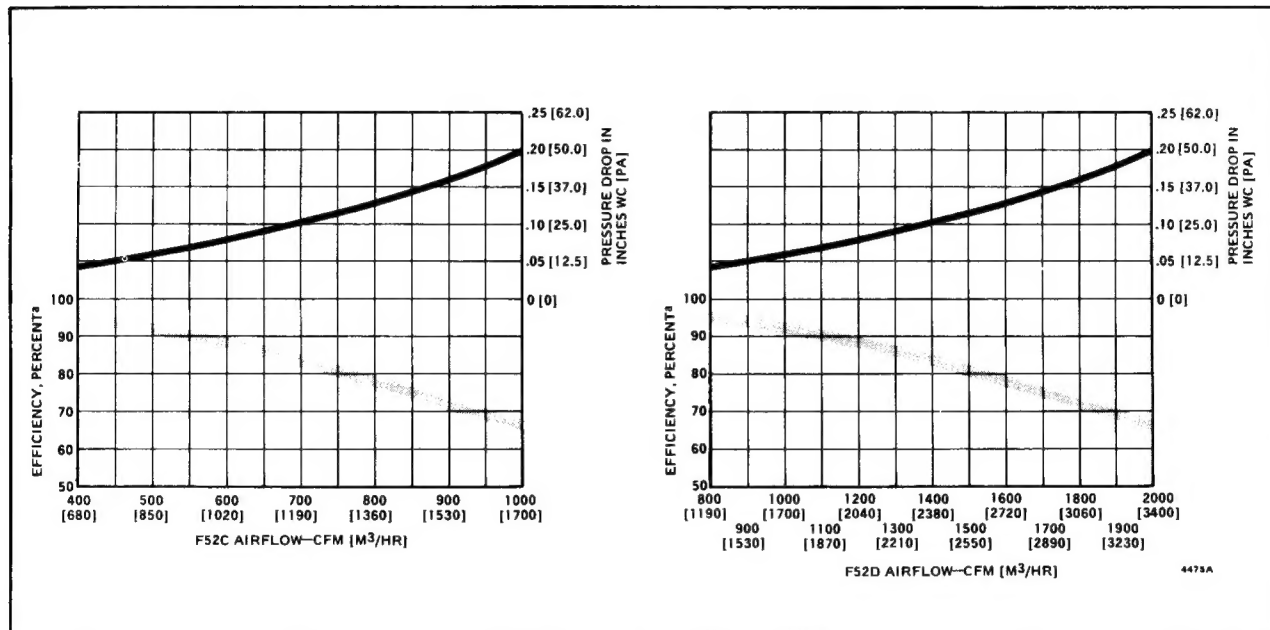
## CAPACITY, EFFICIENCY, PRESSURE DROP:

## TEMPERATURE RATINGS:

Operating Ambient—40 to 125 F [4 to 52 C].  
Temperature of Airflow Through Cells—40 to 125 F [4 to 52 C].

Maximum Cell Washing Temperature—220F [104 C].  
Storage and Shipping (entire unit)—minus 40 to plus 140 F [minus 40 C to plus 60 C].

**MOUNTING:** Recesses into duct opening on wall or ceiling. On wall installation mount with hinge on bottom or either side (sail switch will not operate if mounted with hinge on top). Not intended for floor installations.



<sup>a</sup>Efficiency ratings are based on National Bureau of Standards Dust Spot Method using atmospheric dust and American Society of Heating, Refrigerating, and Air Conditioning Engineers Standard 52-68.

(continued on page 3)

## ORDERING INFORMATION

WHEN PURCHASING REPLACEMENT AND MODERNIZATION PRODUCTS FROM YOUR TRADELINE WHOLESALE OR YOUR DISTRIBUTOR, REFER TO THE TRADELINE CATALOG OR PRICE SHEETS FOR COMPLETE ORDERING NUMBER, OR SPECIFY—

1. Order number.
2. Accessories, if desired.

IF YOU HAVE ADDITIONAL QUESTIONS, NEED FURTHER INFORMATION, OR WOULD LIKE TO COMMENT ON OUR PRODUCTS OR SERVICES, PLEASE WRITE OR PHONE:

1. YOUR LOCAL HONEYWELL RESIDENTIAL DIVISION SALES OFFICE (CHECK WHITE PAGES OF PHONE DIRECTORY).
2. RESIDENTIAL DIVISION CUSTOMER SERVICE  
HONEYWELL INC., 1885 DOUGLAS DRIVE NORTH  
MINNEAPOLIS, MINNESOTA 55422 (612) 542-7500

(IN CANADA—HONEYWELL CONTROLS LIMITED, 740 ELLESMERE ROAD, SCARBOROUGH, ONTARIO M1P 2V9)  
INTERNATIONAL SALES AND SERVICE OFFICES IN ALL PRINCIPAL CITIES OF THE WORLD.

**WEIGHT:**

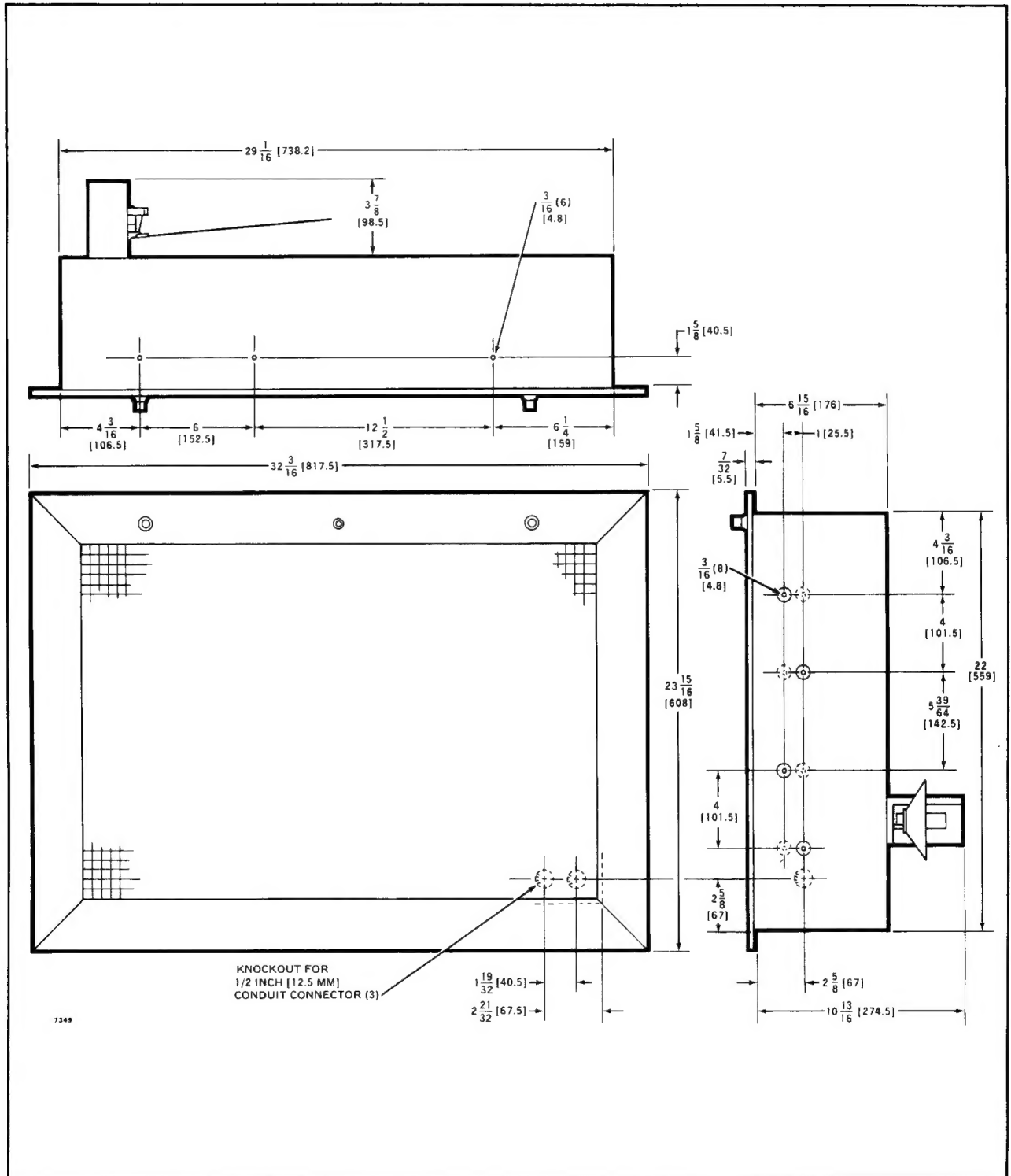
	F52C		F52D	
	LB	KG	LB	KG
Shipping	52	23.4	81	36.5
Installed	40	18.0	66	29.7
Cell(s)—included in above weights	9-1/2	4.3	(2) 9-1/2 ea.	(2) 4.3 ea.

**DIMENSIONS:** See Figs. 1 and 2.

**CELL SIZE:** 12-1/2 x 20 inch [317.5 x 508 mm].

**UNDERWRITERS LABORATORIES INC. LISTED:**  
File No. E30954, Guide No. AGGZ.

**CANADIAN STANDARDS ASSOCIATION LISTED:**  
File No. LR19060-L.



**FIG. 1—INSTALLATION DIMENSIONS, IN INCHES [MILLIMETRES SHOWN IN BRACKETS], OF THE F52D ELECTRONIC AIR CLEANER.**

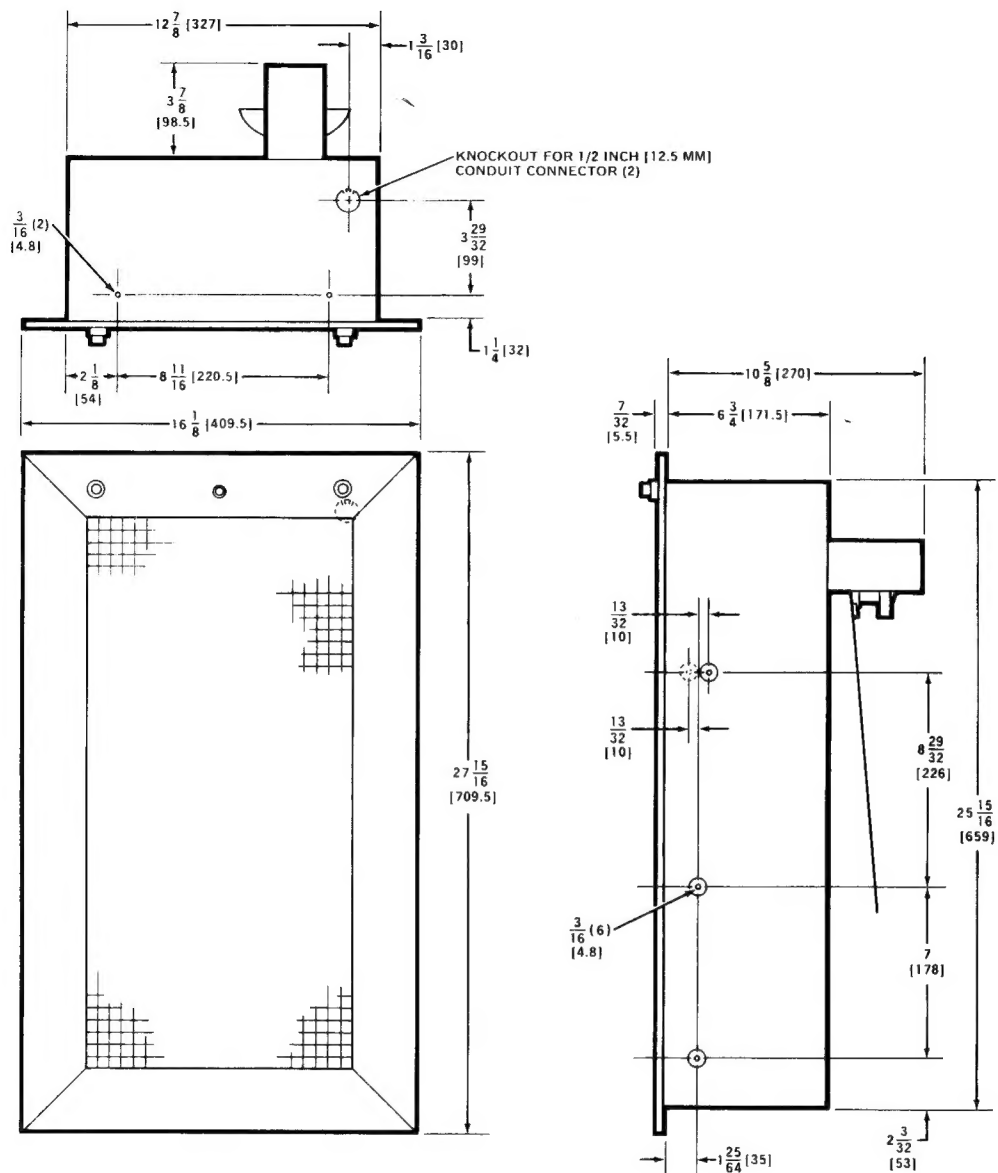


FIG. 2—INSTALLATION DIMENSIONS, IN INCHES [MILLIMETRES SHOWN IN BRACKETS], OF THE F52C ELECTRONIC AIR CLEANER.

## GENERAL INFORMATION

### APPLICATION

The F52 should be installed in the return duct opening of a central air handling system. All of the air circulated by the system must pass through the electronic air cleaner.

### CONSTRUCTION

The entire front grille of the F52 electronic air cleaner is hinged to provide access to the internal components.

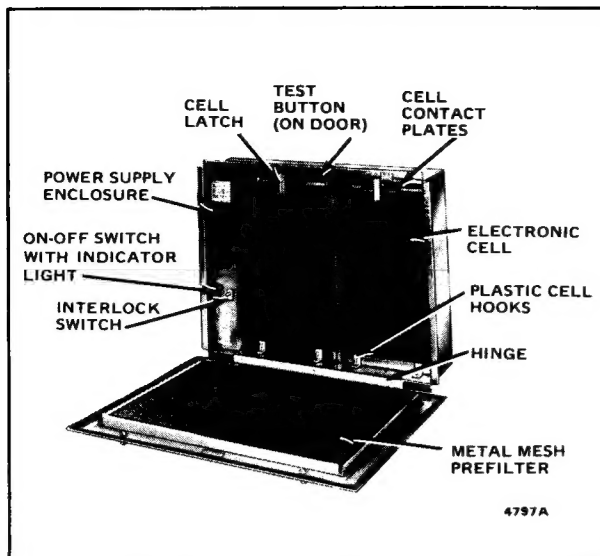


FIG. 3—INTERNAL COMPONENTS OF THE F52.

The F52C has one electronic cell while the F52D has two. The electronic cells must be installed with the ionizer section (side with fine wires) next to the front of the grille so the return air passes through it first.

The cells are held in place by plastic hooks and a quarter-turn latch.

A spring contact provides the electrical connection between the high voltage power supply and the electronic cells.

An interlock switch interrupts the line voltage to the power supply when the grille is opened. A rocker type ON-OFF switch permits the F52 to be turned off manually. This switch also contains the indicator light.

## PLANNING THE INSTALLATION

The F52 should be installed in place of the return grille where all air circulated by the system will pass through it.

It may be used in either a wall or ceiling return, but not a floor return. Typical installations are illustrated in the following figures.

On a wall installation, the F52 may be mounted with the grille hinge on the bottom or either side. Do not install unit with the hinge on top as it is difficult to remove the cell(s) in this position.

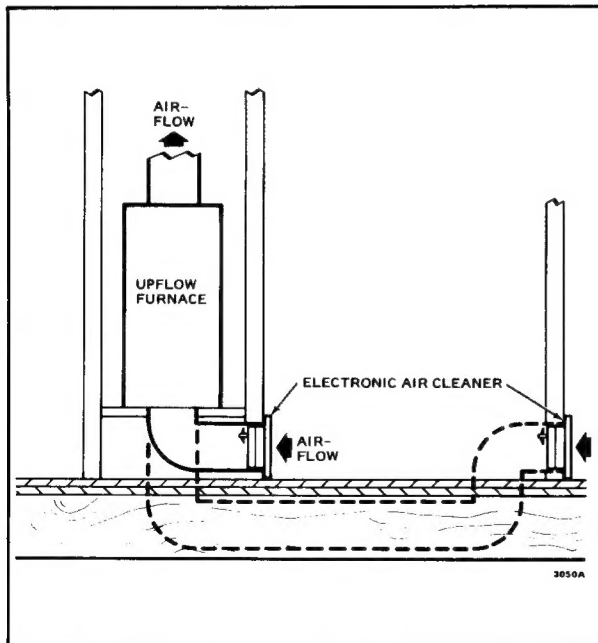


FIG. 4—TYPICAL F52 APPLICATION ON A PLATFORM MOUNTED UPFLOW FURNACE.

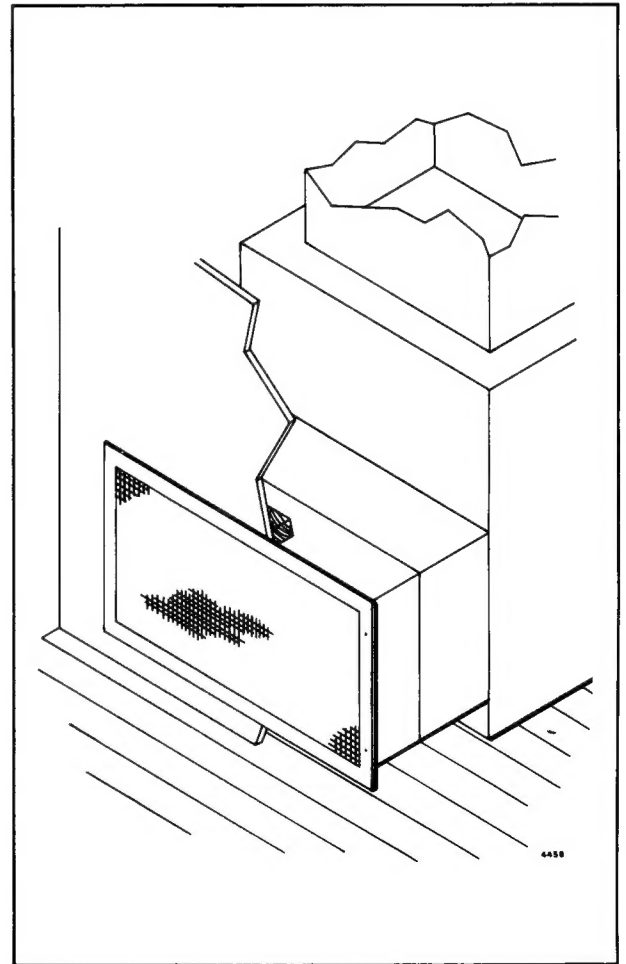


FIG. 5—TYPICAL F52 INSTALLATION ON AN UPFLOW (HIGHBOY) FURNACE.



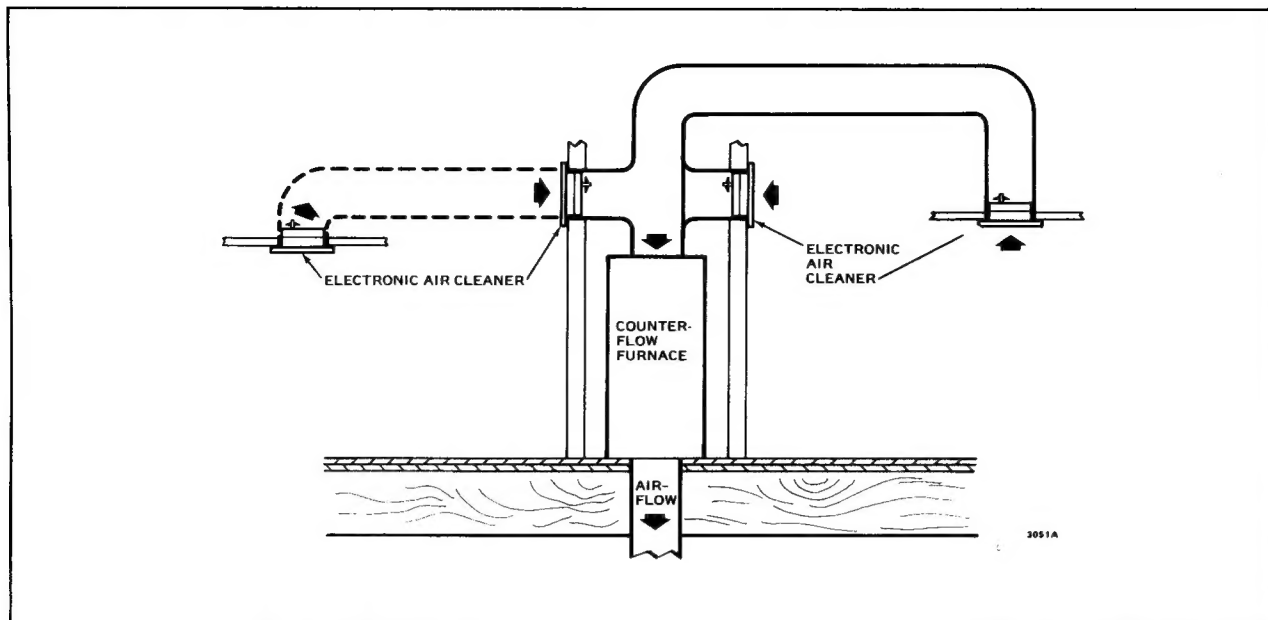


FIG. 6-TYPICAL F52 APPLICATION ON A HIGH CAPACITY COUNTERFLOW (DOWNFLOW) FURNACE.

## INSTALLATION

### CAUTION

1. Installer must be a trained, experienced serviceman.
2. Disconnect power supply before beginning installation to prevent possible electrical shock or equipment damage.
3. Conduct a thorough checkout after installation is complete.

### SHEETMETAL

The return duct opening should be framed to provide adequate support for the air cleaner. End the duct at, or slightly behind, the finished wall surface. Do not use a standard register flange. The front of the grille may not fit tightly against the wall when a flange is used.

Size the duct opening to fit the air cleaner as closely as possible. The *actual size* of the air cleaner is:

F52C-25-15/16 x 12-7/8 inches [659 x 327 millimetres].

F52D-29-1/16 x 22 inches [738.2 x 559 millimetres].

Allow a clear area of approximately 18 inches [457 millimetres], from the finished wall surface into the duct, for proper operation of the sail switch.

### WALL OPENING

The F52C is designed to fit between 16 in. [406.5 mm] centered studs. The F54D fits between 24 in. [609.5 mm] centered studs.

When the wall opening is larger than the F52, blank off the unused portion with structurally sound wood or metal framing. Cover with wallboard, plywood, or other material and finish to match the wall.

### TRANSITIONS

Where the existing duct does not match the size of the F52, use gradual transitions in duct size to ensure even airflow through the electronic cells. Use no more than a 20 degree expansion per duct side (4 inches per lineal foot [100 millimetres per 300 lineal millimetres]).

### TURNING VANES

If it is necessary to install the air cleaner very close to an abrupt bend in the duct, use turning vanes inside the duct. This will help to evenly distribute airflow across the face of the electronic cells.

### UNPACKING

Before removing the air cleaner from the packing box, push in the 2 door latches and turn to open the grille. Remove the electronic cells and door assembly. Put them in a safe place until the installation is completed.

The following items are packed in the F52 carton:

- ☐ F52C or D electronic air cleaner, including—
  - ☐ Door assembly.
  - ☐ Metal mesh prefilter.
  - ☐ Electronic cell (2 in F52D).
- ☐ Sail switch.
- ☐ Small parts envelope (in wiring compartment).
- ☐ L Bracket for mounting sail switch (in wiring compartment).
- ☐ Literature package.

### MOUNT SAIL SWITCH

Before installing the F52 electronic air cleaner, the sail switch should be mounted on the back.

### INSTALLATION HINT

The sail switch may be wired after the air cleaner is installed in the duct opening, but it's easier to do it before installation. The sail may be mounted on the switch after installation to prevent damage to the sail.

### ADAPT SWITCH TO F52 MOUNTING POSITION

The S688A is provided with 2 counterbalancing springs in place as shown in Fig. 7. These springs offset the effect of gravity for different airflow directions.

### IMPORTANT

The switch is never used with both springs attached. One or both springs must be removed as instructed below before installation. The switch will not operate with the wrong spring in place.

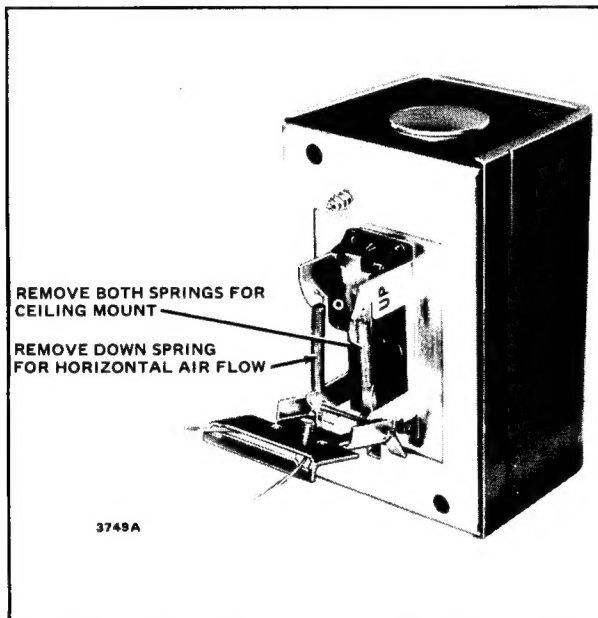


FIG. 7—ADAPTING THE SAIL SWITCH TO DIFFERENT F52 MOUNTING POSITIONS.

Adapt the sail switch to different F52 mounting positions:

- Remove both springs when the F52 is mounted on the ceiling.
- For all other mounting positions, remove the spring marked DOWN only. The spring marked UP remains attached.

### MOUNT SAIL SWITCH ON THE F52

1. Remove the sail switch L-shaped mounting bracket and small parts envelope from the F52 wiring compartment.
2. Remove sail switch cover and remove knockout on the bottom of the sail switch.
3. Turn the air cleaner over and rest it on the carton. To avoid scratching the painted surfaces assemble door to unit later.
4. Mount the sail on the sail switch.

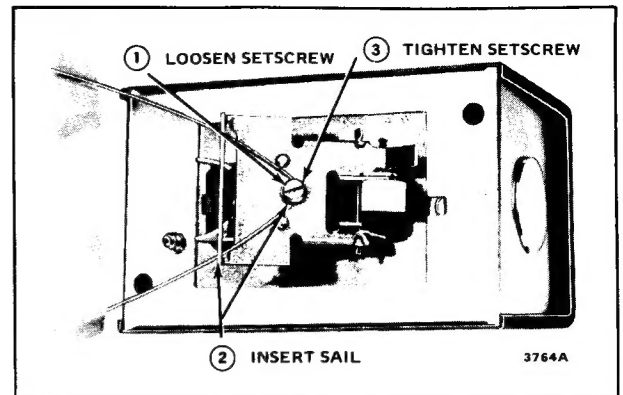


FIG. 8—SLIP WIRE SAIL SUPPORT THROUGH SLOT AND FASTEN UNDER SCREW ON SAIL SWITCH.

5. Locate the 2 black wires extending from the back of the power supply. Pull wires through L bracket and case knockout. Using 2 small metal screws from the envelope, mount the L bracket and sail switch so that the sail will extend into the airflow. (Ignore the airflow arrows on the sail switch.)

NOTE: If the F52D is mounted horizontally with the power supply on the bottom, the sail switch must be mounted at a 45 degree angle from vertical.

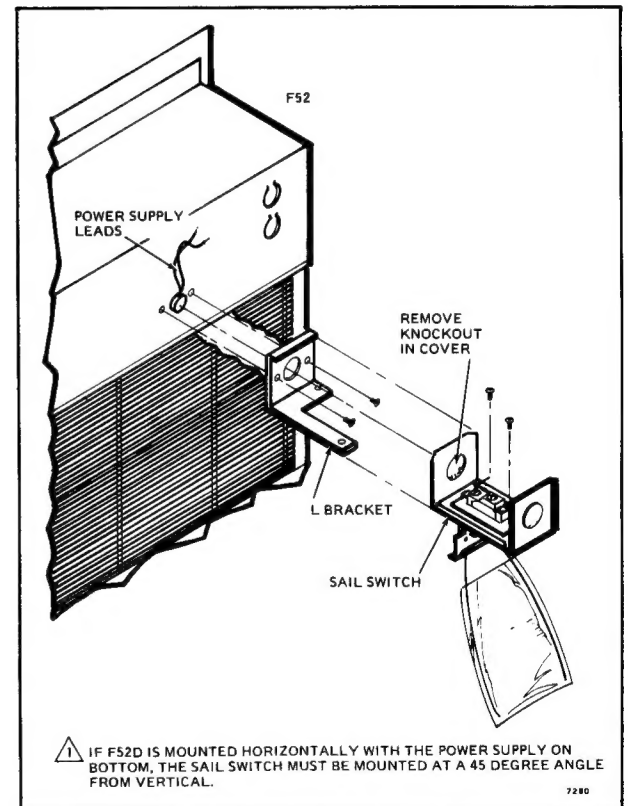


FIG. 9—MOUNT SAIL SWITCH ON BACK OF POWER SUPPLY.

6. Make wiring connections to the N.C. (normally closed) and COM (common) screw terminals in the sail switch.

7. Replace sail switch cover.

## MOUNT AIR CLEANER

Fit the air cleaner into the prepared duct opening so that the flange on the air cleaner frame fits tightly against the finished wall surface. Tack frame to wall surface. Use sheetmetal screws to fasten the air cleaner to the duct and supporting frame. Overly tightened mounting screws may distort the frame and make it difficult to secure the grille with the door latches.

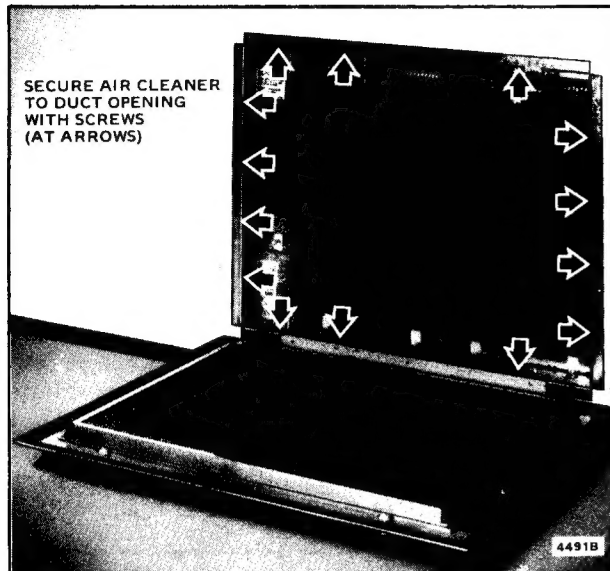


FIG. 10—FASTEN AIR CLEANER TO DUCT WITH SHEETMETAL SCREWS.

## WIRING

### CAUTION

1. All wiring must comply with applicable codes and ordinances.
2. Disconnect power source to prevent electric shock and damage to equipment. Use this device only with a 120V, 60 Hz power source.
3. When making external circuit connections to the line voltage leadwires of this device, use only Underwriters Laboratories Inc. listed connectors.

Install the proper disconnect means as required by local codes.

The only wiring required to the F52 is a constant source of power. No interconnection to the fan system is required for proper operation. The sail switch on the air cleaner automatically energizes the high voltage power supply when the system fan is running.

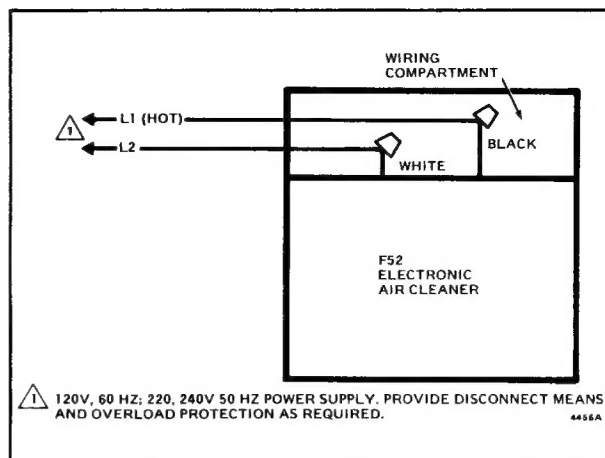


FIG. 11—WIRING THE F52 CONSISTS OF SIMPLY HOOKING IT TO A POWER SOURCE.

## FINAL ASSEMBLY ATTACH CELL HANDLES

Plastic handles, found in the literature package, must be attached to the electronic cells. Depending on where the unit is located, one side of the cell or the other may prove to be a more convenient location for the cell handle.

1. Install the sliding end of the handle in the rectangular slot on the end of the cell. Hold the handle sideways, insert it into the slot, and rotate it 90 degrees to line up the other tab with the square hole.

2. Insert the other tab into the square hole and lock in place by bending back the wedge part and inserting it into the tab.

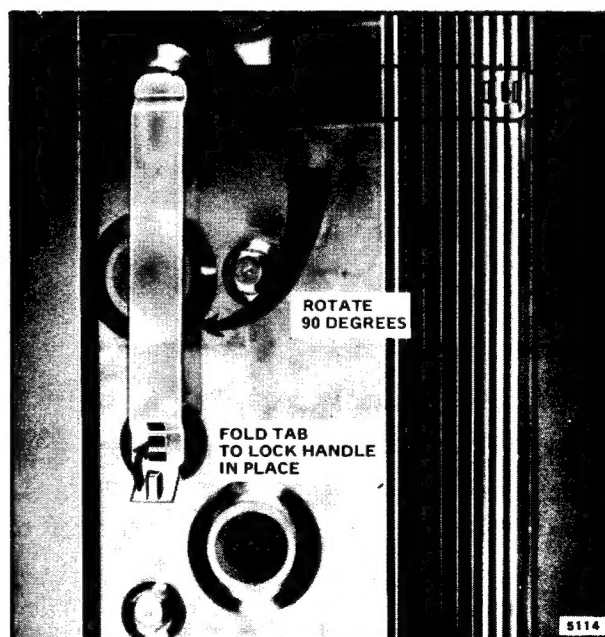


FIG. 12—ATTACHING CELL HANDLE.



### INSTALL ELECTRONIC CELLS

1. Grasp the cell handle and insert cell into unit. Fit the inserted edge of cell in the plastic hooks.

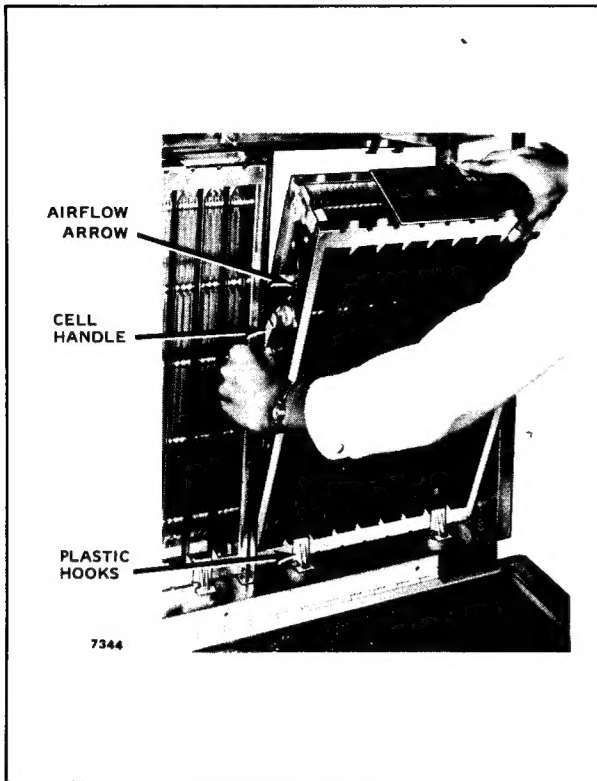


FIG 13—FIT CELL IN PLASTIC HOOKS.

2. Place cell into position and rotate the cell latches to lock the cell in place.

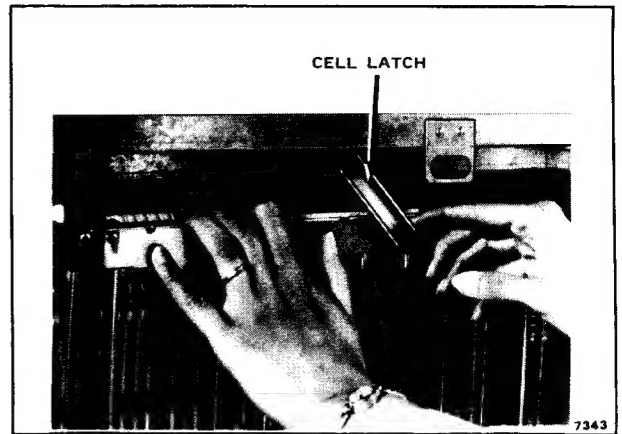


FIG. 14—ROTATE CELL LATCHES.

#### IMPORTANT

The electronic cells must be properly oriented for the air cleaner to work as intended.

1. The red fiberboard with the cell electrical contacts must meet the electrical connections at the top of the cell enclosure.
2. The arrow on the side of the cell must point in the direction of airflow (toward the wall or ceiling).
3. The ionizing wires must face outward.

### PAINTING THE F52

The frame of the F52 is painted off white to fit in with most decorating schemes. If it is desirable, the frame may be painted another color. Make sure the frame is clean and use a durable type of paint. Disassemble the complete door for painting.

## ADJUSTMENTS

### OZONE ODOR

The odor of ozone may be noticeable during operation of an electronic air cleaner. A somewhat higher ozone generation rate during the first week or two of operation may be caused by sharp edges on some of the new high voltage parts. Normal use dulls these sharp edges in a short time.

The odor of ozone is detectable by an average person at levels as low as 0.003 to 0.010 parts per million (PPM). The concentration of ozone produced in a home by an electronic air cleaner ranges from 0.005 to 0.010 PPM. Average concentrations of ozone in the air of major cities range from 0.020 to 0.040 PPM and even higher. This is well above the level produced by an electronic air cleaner.

The Food and Drug Administration (FDA) has recommended that the ozone concentration indoors shall not exceed 0.050 PPM. The electronic air cleaner produces only 10 to 20 percent of this maximum safe level.

If desired, ozone odor can be reduced in one of the following ways:

1. Interchange the yellow and blue leads to the resonant winding of the high voltage transformer, reducing the high voltage output. Proceed as follows:

- a. Turn off power.
- b. Open the grille.
- c. Remove the cover of the power supply enclosure (4 screws).

- d. Unplug the red (ionizer) and black (collector) wires from the component board of the high voltage power supply.
- e. Remove the power supply (2 screws).
- f. Cut the yellow and blue wires leading to the resonant winding of the transformer as indicated in Fig. 15. Strip about 1/4 inch [6 mm] of insulation from each of the 4 ends.
- g. Connect the blue wire leading from the capacitor to the yellow wire leading from the transformer. See Fig. 16.
- h. Connect the blue wire leading from the transformer to the yellow wire that goes through the wire clamp (Fig. 16).
- i. Tape these connections.
- j. Reinstall the power supply and plug in the red and black wires on the component board.

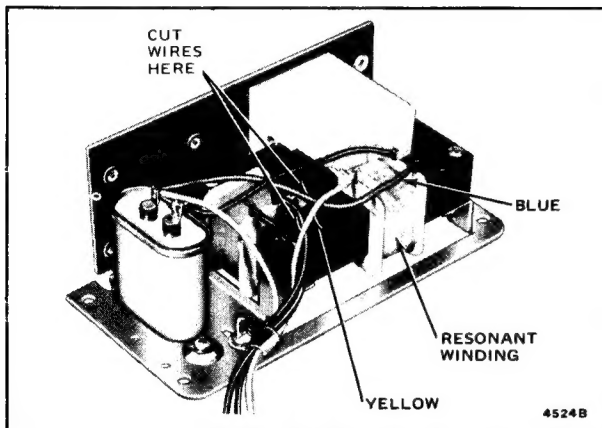


FIG. 15—CUT THE RESONANT WINDING LEADS AS SHOWN HERE.

2. The blue and yellow wires can also be switched by unsoldering them from the resonant winding. If this method is selected, use extreme care to avoid melting the coil form or loosening the fine wire from the terminals. NOTE: Switching these 2 leads can reduce air cleaning efficiency by 3 to 8 percent, depending on air volume.

3. Install an activated carbon filter in the duct downstream of the air cleaner. Be sure to leave enough space between the air cleaner and the carbon filter so the sail switch is not obstructed. There must be no chance of the carbon filter coming in contact with the electronic cells or sail switch. Some carbon filters are combustible and contact with high voltage could result in smoke or fire.

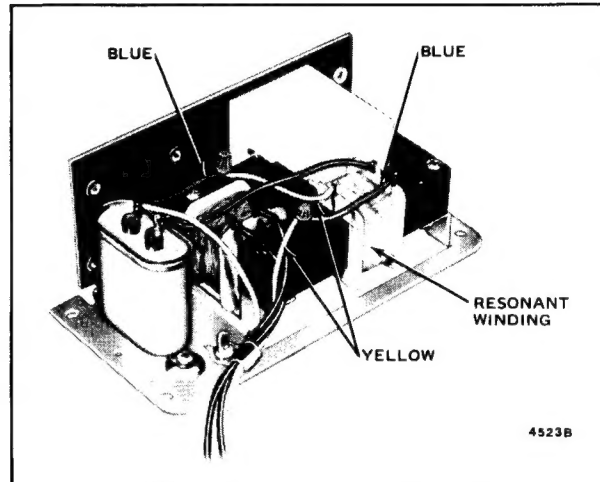


FIG. 16—USE WIRE NUTS TO RECONNECT THE WIRES AS SHOWN HERE.

## CHECKOUT

### IMPORTANT

Before putting the F52 electronic air cleaner into service, check the following items to be sure it has been properly installed.

### ELECTRICAL CONNECTIONS

1. Inspect the connections in the wiring compartment. Be sure the connections are properly made with the proper connectors.
2. Inspect the sail switch wiring. Power supply leads should be connected to COM and N.C. terminals on sail switch.

### GENERAL COMPONENT INSPECTION

1. Open the grille and check for proper positioning of the metal mesh prefilter.
2. Check for proper electronic cell orientation. Arrows on cells must point away from the grille.
3. Check for good contact between the electronic cell contacts and the power supply contacts.

4. Inspect the grille, screen, and cells to be sure that they are clean, dry, and free of any foreign objects.

### OPERATIONAL CHECKOUT

With all components in place, turn on the F52 switch and close the grille. Energize the system fan and check the following points of operation:

1. The indicator light in the F52 ON-OFF switch should light. When the fan is stopped, the light should go off.

(The indicator light comes on to show that the air cleaner is energized and that the high voltage power supply is working properly. If the light does not come on, refer to Electrical Troubleshooting, page 12.)

2. With the system fan running and the F52 energized, push the test button. A snapping sound indicates that collector voltage is available. If no snapping sound is heard after several tries, refer to Electrical Troubleshooting, page 12.

# SERVICE

## CAUTION

Use care when handling the electronic cells. The metal edges can be sharp. Use of rubber gloves is suggested during tub washing. The detergent is very strong and the water should be hot. When washing in a dishwasher, the cell may be hot if removed during, or right after, the dry cycle.

## WASHING THE ELECTRONIC CELLS

For optimum performance, the electronic cells and protective screen must be washed regularly to remove the dirt cleaned from the air.

The required frequency of cell washing varies from one installation to another, depending on a large number of variables. In nearly all cases, the correct period is between one and six months. Where infiltration and internal generation of particulate contamination is light, as in a smaller home occupied by 1 to 3 nonsmokers, washing every five or six months may be adequate. With a heavy dirt loading of cooking and tobacco smoke, dust, and soot in the air, more frequent washing will be required. A home with several active children, heavy cooking and laundry, and frequent entertaining may cause cells to load and require washing monthly.

If a very heavy buildup of dirt is found on the collector plates, or the cell is still not clean after washing, it should be washed more frequently. On the other hand, if only light dirt loading is noticed, the period between washings can probably be lengthened.

The WASH REMINDER SCHEDULE should be posted in a convenient place near the electronic air cleaner where it will be seen regularly. Use it to record the date on which the cells are washed and to establish the correct schedule for cell washing.

The electronic cells and protective screen may be washed in a number of different ways, depending on homeowner preference. Perhaps the most convenient way is in an automatic dishwasher. They may also be washed manually by soaking, or with the hand sprayer at a do-it-yourself, coin-operated car wash.

## AUTOMATIC DISHWASHER

The easiest and most convenient way to remove the accumulated dirt from the electronic cells is to wash them in an automatic dishwasher. The dishwasher automatically provides the correct cycle of wash, rinse, and dry to clean the cell. The cell has been designed to withstand the high temperatures encountered in a dishwasher.

1. Take out the protective screen and remove the lint by using a vacuum cleaner, rapping them on a sheet of newspaper, or spraying with a garden hose. The protective screen may then be washed at the same time as the electronic cells, if it will fit in the dishwasher. The screen must be placed in the dishwasher,

so that it will not interfere with the washing of the electronic cells.

NOTE: The F52D prefilter screen may not fit in some dishwashers. If it does not, wash it as described under MANUAL WASHING.

2. Place the electronic cells with the ionizer section down (airflow arrows pointing up), on the lower rack of the dishwasher.

## IMPORTANT

Use care to avoid damage to the collector plates when placing the cells in the dishwasher.

3. Use detergent in accordance with the dishwasher manufacturer's instructions.

4. Allow the dishwasher to run through its complete wash cycle. You may also allow it to run through the complete dry cycle, although this is not necessary.

## CAUTION

The electronic cell will be very hot at the end of the dishwasher's cycle. Allow it to cool or wear protective gloves when handling it. Hot water may accumulate in the tubes supporting the collector plates. Tip the cells so that these tubes will drain.

5. The electronic cells may be installed and energized as soon as they are taken out of the dishwasher.

NOTE: The indicator light may not come on during the normal 2 hour drying period. If annoying arcing occurs during this period, the electronic air cleaner may be switched OFF.

6. With some dishwashers it may be necessary to rerun the complete cycle, or the rinse cycle, after the cells are removed if the homeowner notices dirt or residue inside the dishwasher.

NOTE: Washing the cell(s) more frequently or changing to a different dishwasher detergent may reduce residue.

## MANUAL WASHING

The electronic cells may be washed manually by soaking them in a solution of electric dishwasher detergent.

1. Provide a suitable container, large enough to hold one or both of the cells. A large plastic dishpan, trash container, or laundry tub works well.

2. Select an automatic dishwasher detergent that dissolves readily in hot water. Tests have shown major brands such as ALL, FINISH, and ELECTRA SOL perform very well. Depending on local water conditions, some brands may form a precipitate or scum. If a noticeable scum floats to the surface, try another brand. The brand that the homeowner finds to give best results in his electric dishwasher will probably give best results in washing the electronic cells.

## CAUTION

Do not splash the detergent solution in eyes, and avoid prolonged contact with skin. Keep detergent and solution out of reach of children.

3. Before placing cells in washing container, pour in the detergent. Use approximately 3/4 of a cup per cell if the container is about the size of the cell, or proportionately more if the container is larger. Add enough very hot water to cover the cell or cells.

4. After the detergent has completely dissolved, place the electronic cell (or cells) in the container.

5. Soak the cells for 15 to 20 minutes, slosh several times, and remove.

6. Next, wash the protective screen by sloshing it several times in the detergent solution. Drain the wash container. The protective screen can be washed off with a garden hose or vacuumed, if more convenient than washing in the detergent solution.

### IMPORTANT

Do not pull the electronic cells into the detergent solution after washing the protective screens in it. Lint from the protective screens may get caught in the cells.

7. Rinse the cells and screens with a fine spray.

8. Fill the wash container with clean hot water and soak the cells and screens for 5 to 15 minutes.

9. Remove the cells and screens and let the water drain from them. If the water draining from them feels slippery, detergent still remains. Repeat the rinsing until the water from them no longer feels slippery. Inspect for cleanliness. Allow water to drip from cells.

10. When cells and screens have been washed and rinsed, check cells for broken wires and bent collector plates, replace them in the air cleaner, and return the system to normal operation.

NOTE: If you have just washed the cells, they may be replaced in the cabinet even though they are still wet. In this case the indicator light may not come on during the normal 2 hour drying period. If annoying arcing occurs during this period, the electronic air cleaner may be switched OFF.

### IMPORTANT

Be sure the cells are properly oriented—airflow arrows pointing away from grille.

## WASHING THE GRILLE

The grille may require washing periodically, though not as frequently as the electronic cells and prefilter. When it appears dirty, it may be disassembled, and cleaned by sloshing in a solution of mild detergent in warm water.

## IONIZING WIRE REPLACEMENT

The fine tungsten ionizing wires, in the charging section of the electronic cell may break or become damaged. Inspect the cell from the upstream side after washing to make sure that none of the wires are broken or out of position. During operation, a broken or deformed wire generally causes a short to ground, possibly with visible arcing or sparking. This condition, or any other short in the ionizing section of the cell, will cause the indicator light to go out.

Broken wires must be replaced as soon as possible. Remove all parts of the broken wire. If necessary, the cell may be temporarily used with one wire missing. See PARTS LIST, page 19 for part number of the replacement wire. Wires come cut to length with eyelets at each end for easy installation in the electronic cell. To replace ionizing wire:

1. Use care to avoid damage to the spring connector or other parts of the cell during the installation.
2. Hook one end of the ionizing wire over the spring connector at one end of the cell.
3. Hold the opposite eyelet with a needlenose pliers and stretch the wire the length of the cell. Depress the opposite spring connector and hook the eyelet over it.

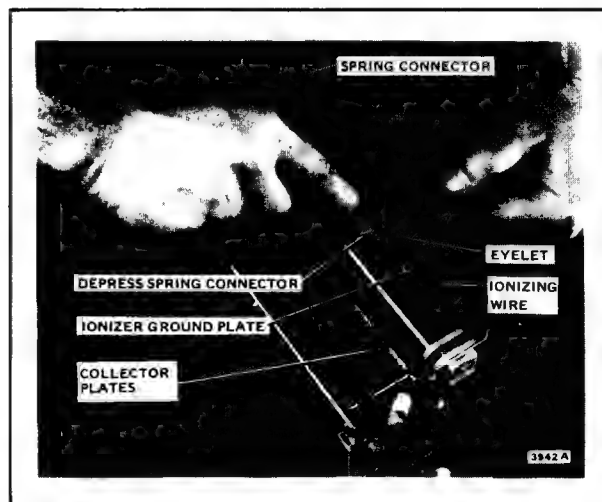


FIG. 17—INSTALLATION OF NEW IONIZING WIRES.

# ELECTRICAL TROUBLESHOOTING

## CAUTION

1. During the troubleshooting procedures, dangerous line voltage circuits are exposed. Use care to avoid the hazard of electrical shock or damage to equipment.
2. Although not lethal, the high voltage output of the power supply can produce a painful shock. Use caution here too.

## TOOLS AND EQUIPMENT

Troubleshooting the F52 can be accomplished with only a few tools.

- Screwdrivers—long shank, plastic or rubber handles; two required for some arc checks.
- Needlenose pliers—for stringing ionizing wires.
- Test Meter—Honeywell W869 Electronic Air Cleaner Test Meter, or
- Simpson 260 with 25 kV dc probe.
- Soldering iron for replacing components.
- Neon test lamp for line voltage.
- A spare silicon diode.

## TROUBLESHOOTING PROCEDURE

Most of the troubleshooting steps can be performed by observing the indicator light in the ON-OFF switch. This light is powered by the resonating winding on the high voltage transformer and is ON whenever the high voltage transformer is working properly.

The following troubleshooting procedure has been designed to speed the serviceman's work and insure that any malfunction in the F52 electronic air cleaner is quickly detected and properly repaired.

This procedure is outlined in the flow chart below.

A complete description is provided on the following pages.

The troubleshooting procedure description is divided into 2 sections:

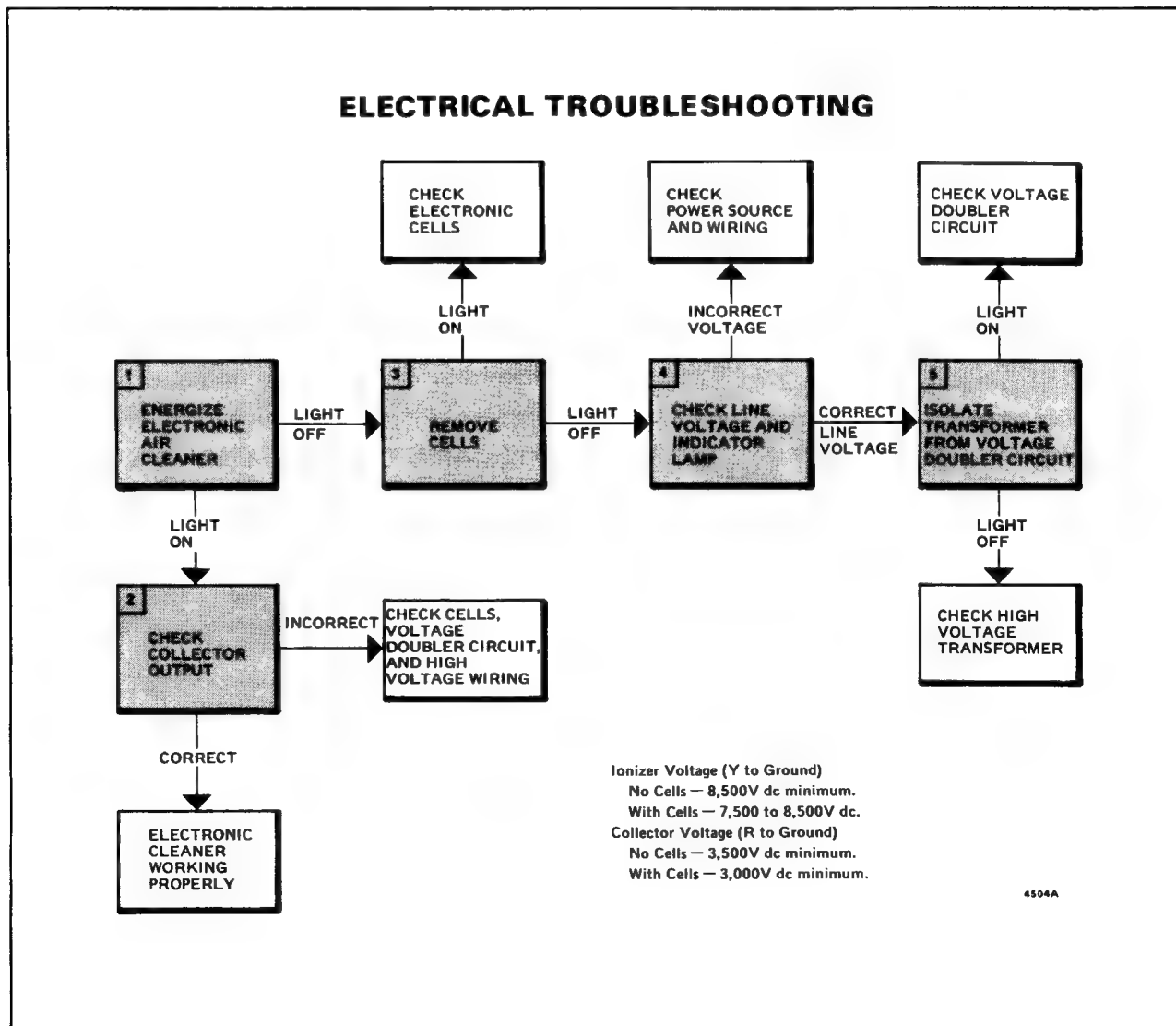
1. **DIAGNOSTIC CHECKS**—The numbered steps correspond to the numbered steps on the troubleshooting flow chart. Follow this sequence of checks to locate the cause of a failure within the air cleaner.

2. **COMPONENT CHECKS**—Explains how to locate a faulty component within an assembly, or how to prove a component good or bad.

## DIAGNOSTIC CHECKS

### 1. ENERGIZE ELECTRONIC AIR CLEANER

- a. Be sure that the electronic cells and protective screen are clean, dry, and properly installed in the air cleaner.
- b. Energize the electronic air cleaner.
  - Put F52 switch in ON position.
  - Turn on system fan.
- c. Check for indicator light operation.
  - If light is off, there is a failure in the electronic air cleaner—go to step 3.
  - If the light is on, go to step 2.





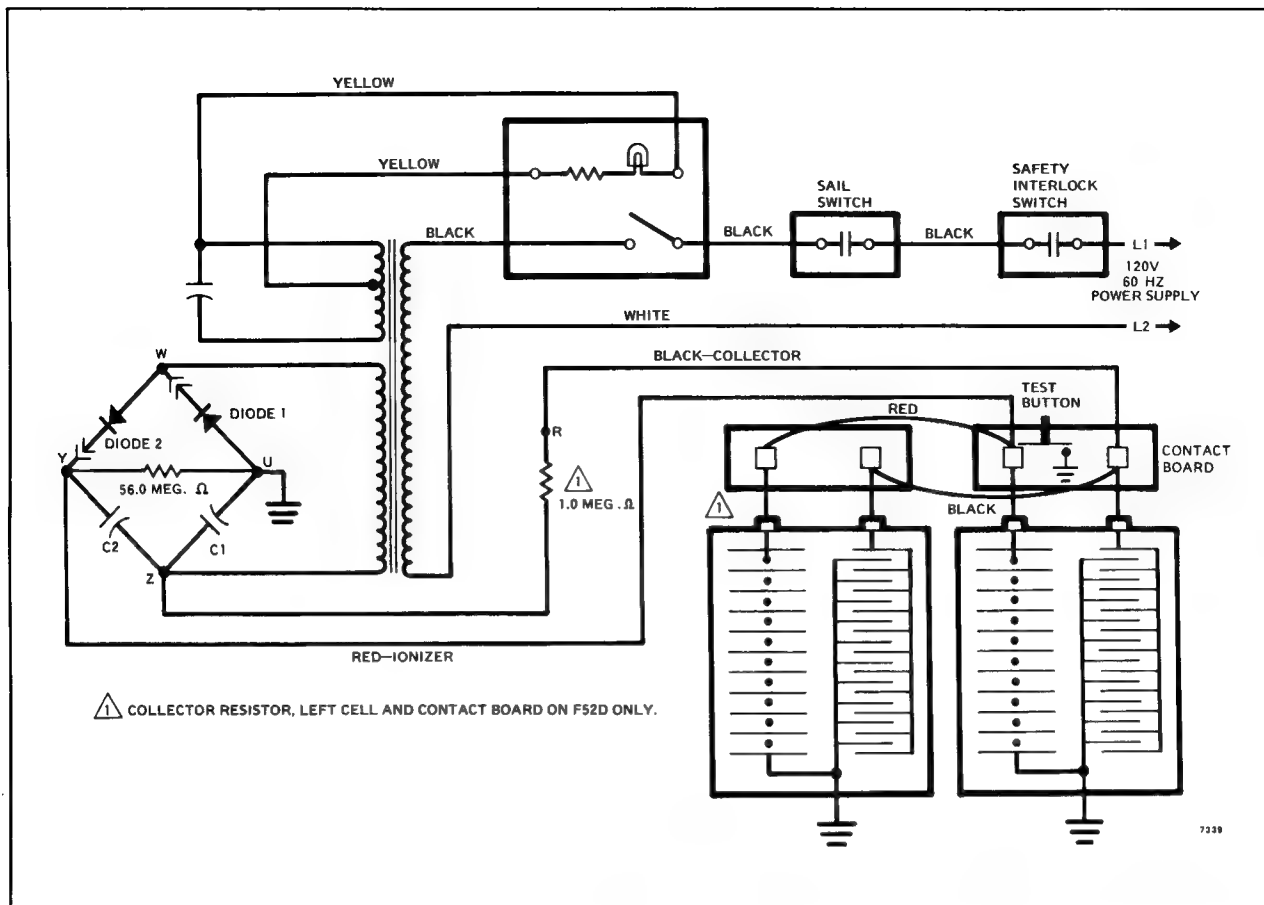


FIG. 18—F52 INTERNAL SCHEMATIC DIAGRAM.

## 2. CHECK COLLECTOR OUTPUT

The TEST BUTTON on the power supply cover provides a simple, easy-to-use method of checking for correct collector voltage in the high voltage power supply. When pushed, it shorts from the collector terminal to ground. From the sound of the resulting arc, the serviceman may determine whether or not the high voltage is supplied to the collector.

- Turn on the air cleaner and energize the system fan to power the electronic air cleaner.
- Push TEST BUTTON. Snapping sounds indicate that the air cleaner is working properly.
- If no arcing noise is heard, check for continuity through the collector resistor (Fig. 21), and then check for a failure in the electronic cells. Go on to step 3.

## 3. REMOVE CELLS

- Rotate cell latch and swing out cells.
- With the cells disconnected from the power supply, energize the high voltage power supply.
  - If the indicator light comes on now, when it was off with the cells in place, check out the electronic cells.
  - If the indicator light still does not come on, there is a problem in the high voltage power supply or power source. Continue your checkout, step 4.

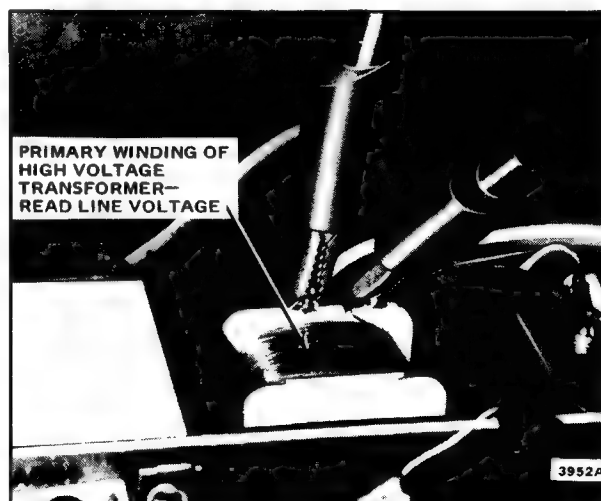


FIG. 19—CHECK FOR LINE VOLTAGE.

## 4. CHECK LINE VOLTAGE POWER SUPPLY AND INDICATOR LAMP

- Open the power supply enclosure as follows:
  - Turn off power.
  - Open the grille.
  - Remove the screws securing the cover on the power supply enclosure. Take off this cover.

- b. Check for correct line voltage on the primary of high voltage transformer. See Fig. 19.
  - (1) If line voltage power is not present, check back through the power source wiring to locate the problem.
  - (2) If the correct voltage is measured, continue with check c., below.
- c. Energize the high voltage power supply and check voltage across yellow leads for correct operation of the indicator light.
  - (1) If the voltage is correct (about 120V ac) but the light is out, replace the switch-light assembly.
  - (2) If there is no voltage, or less than 100V ac, continue the checkout (step 5).

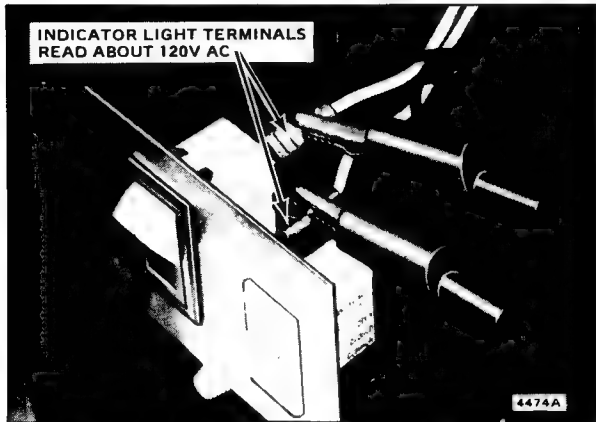


FIG. 20—USE A METER OR TEST LIGHT TO CHECK FOR VOLTAGE ON INDICATOR LIGHT IN ON-OFF SWITCH.

#### 5. ISOLATE TRANSFORMER FROM VOLTAGE DOUBLER CIRCUIT

- a. Turn off power.
- b. Unplug the two quick-connectors on the diodes (points W and Y). This disconnects the voltage doubler circuit from the high voltage transformer.
- c. Energize the power supply.
  - (1) If the light comes on, check for a problem in the voltage doubler circuit.
  - (2) If the light still does not come on, check for a problem in the high voltage transformer.

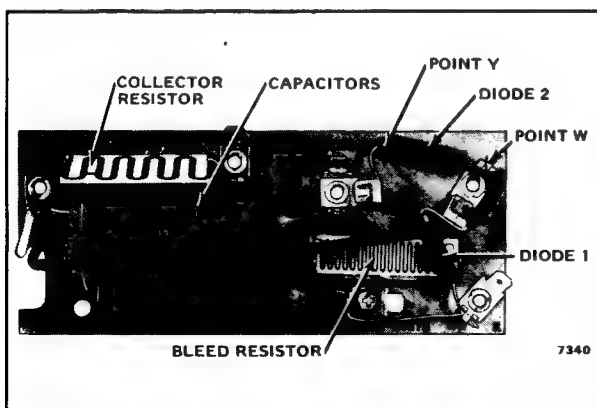


FIG. 21—DISCONNECT DIODES AT POINTS W AND Y.

#### COMPONENT CHECKS CHECK ELECTRONIC CELLS

Carefully examine the electronic cells. Look especially for:

- Bent collector plates.
- Broken ionizing wires.
- Dirt accumulation on insulators.
- Damage to ionizer and collector contact tabs.
- Good contact between cell and power supply contacts.

#### CHECK FOR SHORT CIRCUITS

Use an ohmmeter to check resistance between the outside frame of the cell and both the ionizer and collector contacts. In each case the resistance should be infinite (open circuit).



FIG. 22—USE AN OHMMETER TO CHECK THE ELECTRONIC CELLS FOR SHORT CIRCUITS.

#### CHECK VOLTAGE DOUBLER CIRCUIT

This check will locate a faulty component or connection in the voltage doubler circuit.

#### CAUTION

The line voltage power is turned on and off several times in this check. BE SURE THAT THE POWER IS OFF before connecting or disconnecting any component.

1. Inspect the voltage doubler circuit components for any sign of physical damage.

2. Turn off power and reconnect Diode 2 to point Y. Energize the power supply and check indicator light, or measure voltage or check arc across C2 (Z to Y).

a. Diode 2 and C2 are good if:

- Indicator light goes on (if it was off in earlier checks).
- The voltage across C2 is over 3,500V dc.
- The correct arc is obtained (moderate, blue, snapping spark).

b. Diode 2 or C2 is defective if:

- The indicator light does not come on.
- The voltage across C2 is less than 3,500V dc.
- The proper arc is not obtained.

- c. If the checks show a defective component, unplug Diode 2 and temporarily substitute a good diode.

- A good check now proves Diode 2 faulty. Replace it.

- If a good check still can't be obtained, the capacitor (C2) is defective and must be replaced.

3. Turn off power, disconnect Diode 2 at point Y, and reconnect Diode 1 at point W. Energize the power supply. Check indicator light, or measure voltage or check for arc from point Z to ground.

- a. Diode 1 and C1 are good if:

- Indicator light goes on (if it was off in earlier checks).

- The voltage (Z to ground) is over 3,500V dc.

- The proper arc is obtained (moderate, blue, snapping spark from point Z to ground).

- b. Diode 1 or C1 is defective if:

- Indicator light does not come on.

- The voltage (Z to ground) is under 3,500V dc.

- The proper arc is not obtained.

- c. If the checks show a defective component, unplug Diode 1 and temporarily substitute a good diode.

- A good check now proves Diode 1 faulty. Replace it.

- If a good check still can't be obtained, the capacitor (C1) is defective and must be replaced.

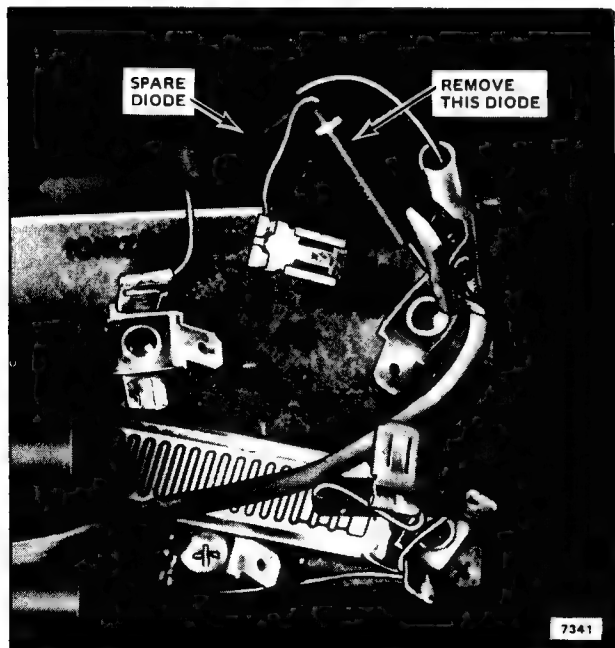


FIG. 23—USE A SPARE DIODE TO CHECK VOLTAGE DOUBLER CIRCUIT OPERATION.

#### CHECK HIGH VOLTAGE TRANSFORMER

If the diagnostic checks indicate a problem in the high voltage transformer, use this check to further isolate the defective component.

1. Turn off power.

2. Unplug the red and white wires from the high voltage power supply component board. (Remove the 2 screws holding the power supply assembly in the enclosure and rotate power supply on models built before mid 1975 only.)

3. Disconnect the black lead from the resonant capacitor.

4. Position the power supply so that none of the high voltage parts will short to ground. Energize the high voltage power supply and measure the resonant winding voltage (black and blue wires).

- a. If this voltage is over 150V ac, the resonant capacitor is defective or the transformer secondary winding is open.

- (1) De-energize the power supply and check for continuity of the secondary winding.

- b. If this voltage is under 150V ac, the transformer is defective and must be replaced.

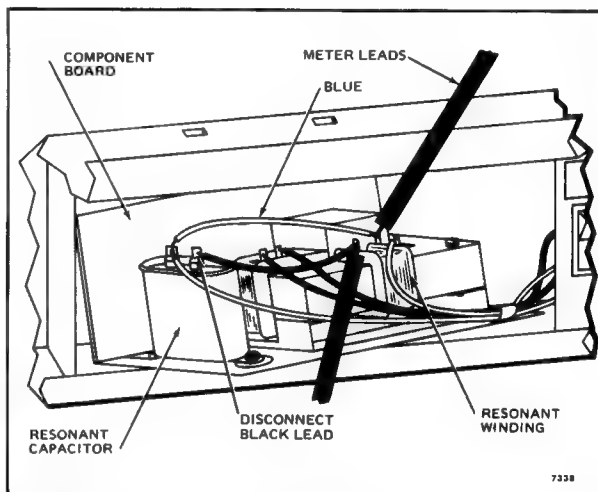


FIG. 24—CHECK TRANSFORMER BY MEASURING OPEN CIRCUIT RESONANT WINDING VOLTAGE FOR F52 MODELS BUILT BEFORE MID 1975.

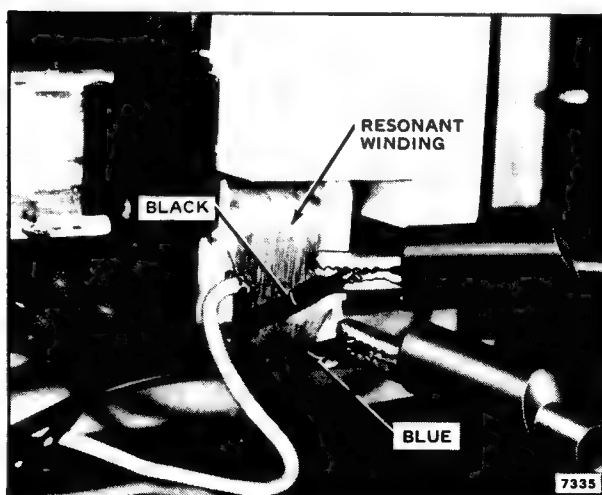


FIG. 25—CHECK TRANSFORMER BY MEASURING OPEN CIRCUIT RESONANT WINDING VOLTAGE FOR F52 MODELS BUILT AFTER MID 1975.

# NOTES

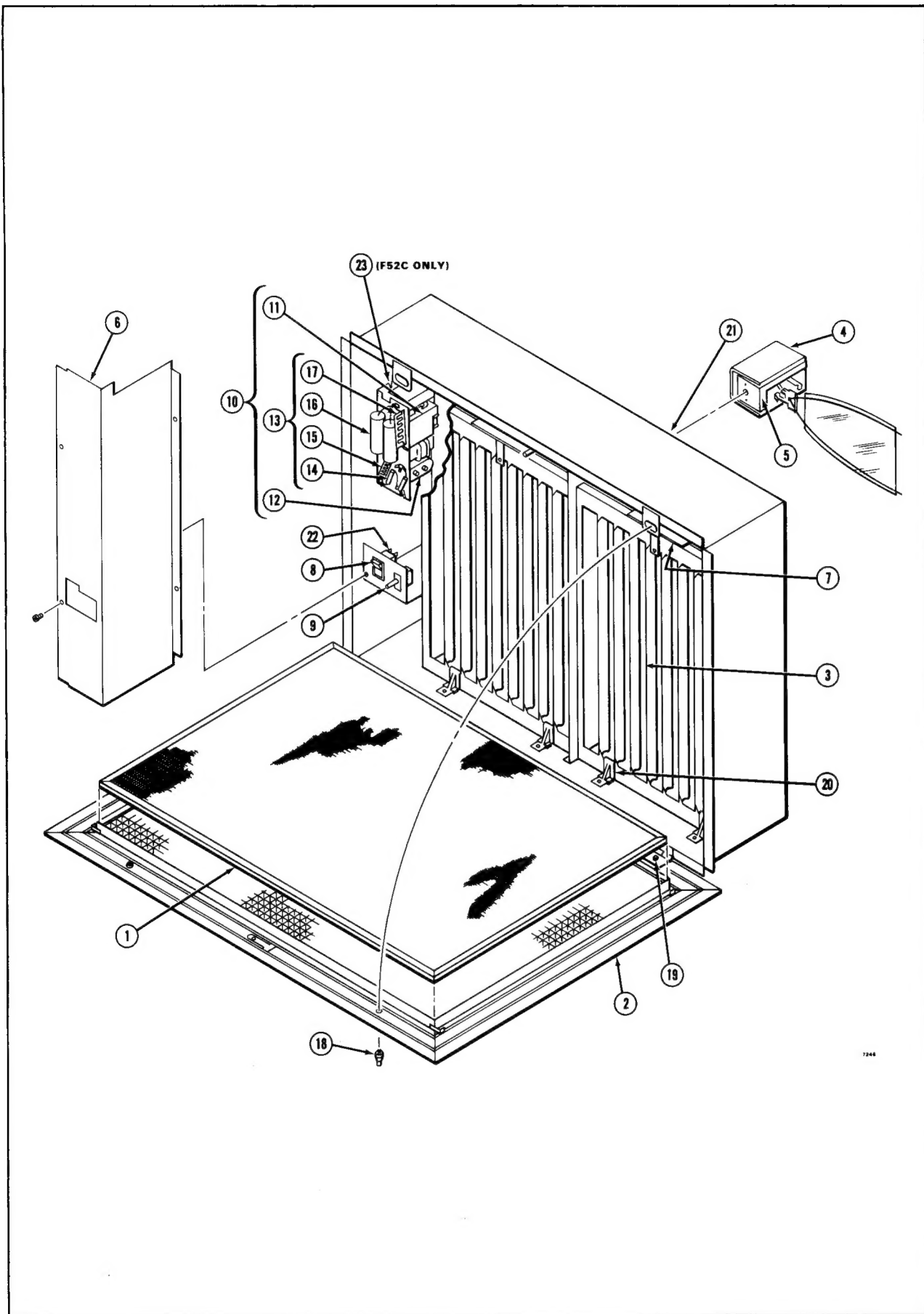


FIG. 26—F52 PARTS ARE KEYED TO LIST ON NEXT PAGE.



# PARTS LIST

NUMBER	DESCRIPTION	PART NUMBER (120V AC MODELS ONLY)	
		F52C	F52D
1	Metal Prefilter	190909	190910
2	Door Assembly (includes prefilter and grille)	190909A	190910A
3	Electronic Cell	FC37A1171	FC37A1171 (2)
4	Sail Switch	S688A1007	S688A1007
5	Sail Switch Bracket	190964	190964
6	Power Supply Enclosure (F52D) Power Supply Cover Plate (F52C)	190941A	190934A
7	Cabinet-Cell Contact Boards	190912A	190912A (2)
8	Switch-Indicator Light Assembly	136363	136363
9	Interlock Switch	190333	190333
10	Power Supply (includes 11 to 17 below)	W919A1150	W919A1457
11	High Voltage Transformer	136572BE	136572AJ
12	Resonant Capacitor	136749	136749
13	Component Board Assembly (includes 14 to 17 below)	136596AB	136596AD
14	Diode (with quick-connect)	137073A (2)	137073A (2)
15	Bleed Resistor	190125A	190125A
16	Capacitor	136912 (2)	136912 (2)
17	Collector Resistor	—	118965A
18	Plastic Door Latch	190915 (2)	190915 (2)
19	Acorn Nut for Door Hinge	190948 (3)	190948 (3)
20	Plastic Hook for Cell(s)	190913	190913 (2)
21	Strain Relief	103074T	103074T
22	Terminal Bushing	138779	138779
23	Adapter Plate for Power Supply	138620	—

**Parts Not Illustrated:**

Ionizing Wires (package of 5)—Part No. 136434AA.

Customer pack of 25 wires also available.

Cell Handle—F52C, Part No. 137266; F52D, Part No. 137266 (2).

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